NORTH DAKOTA PHYSICS · UNIT 4

Light and Modern Physics — Practice Test

North Dakota Physics • 25 questions

This practice test was made by AI and there may be mistakes. If a question or answer looks wrong, use the Flag a mistake button to let Brett know so he can fix it.

1 **Light travels from air into glass and slows down. The ray bends**



A toward the normal

B away from the normal

C not at all

D back on itself

Understand It with Pulse | Flag a mistake

2 **Light in air hits a boundary at an incidence angle of 20 degrees. If the incidence angle doubles to 40 degrees, the reflection angle**

- A It stays at 20 degrees
- B It halves to 10 degrees
- C It doubles to 40 degrees
- D It becomes 90 degrees

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3 **A ray in a medium of refractive index 1.5 enters air. If sin θ for the incident ray is 0.60, the sine of the refracted angle is**

- A 0.40
- B 0.90
- C 1.50
- D 0.60

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4 **The critical angle is the incidence angle at which the refraction angle is**

A 0 degrees

B 45 degrees

C 180 degrees

D 90 degrees

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5 **A converging lens can form a real image that is**



A always upright

B always virtual

C always the same size

D inverted

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6 **An object 6 cm tall is magnified by 2. Its image height is**

- A 3 cm
- B 8 cm
- C 12 cm
- D 4 cm

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7 **In the photoelectric effect, increasing the light intensity at fixed frequency increases the**

- A maximum kinetic energy of electrons
- B number of electrons emitted per second
- C work function
- D threshold frequency

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8 **In the photoelectric effect, no electrons are emitted below the**

A threshold frequency

B speed of light

C critical angle

D work function voltage

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9 **The energy of a photon is proportional to its**

A wavelength

B frequency

C speed

D mass

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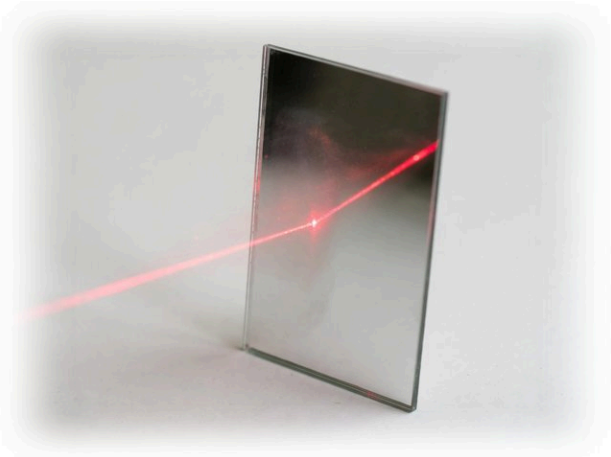
10 **Use $h = 6.63 \times 10^{-34}$ J s. A photon of frequency 2.0×10^{14} Hz has energy about**



A 1.33×10^{-19} J

B 3.32×10^{-20} J

C 1.33×10^{-48} J

D 3.32×10^{-48} J

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11 **An atom emits light when an electron moves from a higher energy level to a**

A higher energy level

B lower energy level

C different atom

D nucleus

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12 **The half life of a sample is 10 years. After 30 years, the fraction remaining is**

A one half

B one fourth

C one third

D one eighth

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13 **In nuclear fission, a heavy nucleus splits into**

- A two lighter nuclei
- B one heavier nucleus
- C only electrons
- D only photons

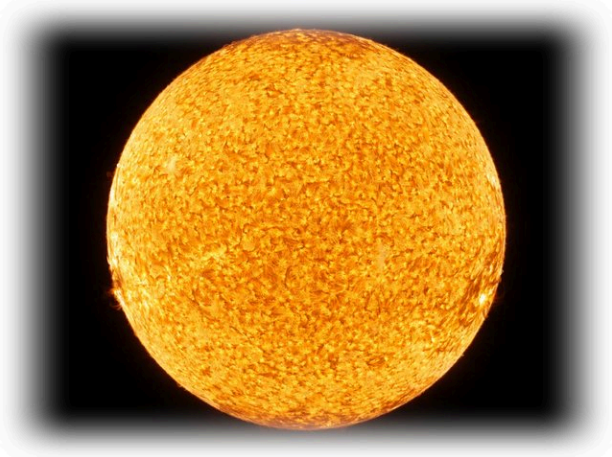
Understand It with Pulse | Flag a mistake

14 **In nuclear fusion, light nuclei join to form a**

- A heavier nucleus
- B lighter nucleus
- C photon only
- D neutron only

Understand It with Pulse | Flag a mistake

15 **The energy released when mass is converted follows**



A E = mc

B E = mc²

C E = mv²

D E = mgh

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16 **A sample starts with 80 g of a radioactive isotope. After two half lives, the mass remaining is**

A 80 g

B 40 g

C 10 g

D 20 g

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17 **Alpha radiation consists of**

A electrons

B helium nuclei

C photons

D protons alone

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18 **Beta minus radiation consists of**

A helium nuclei

B photons

C electrons

D neutrons

Understand It with Pulse | Flag a mistake

19 **Gamma radiation consists of**

A electrons

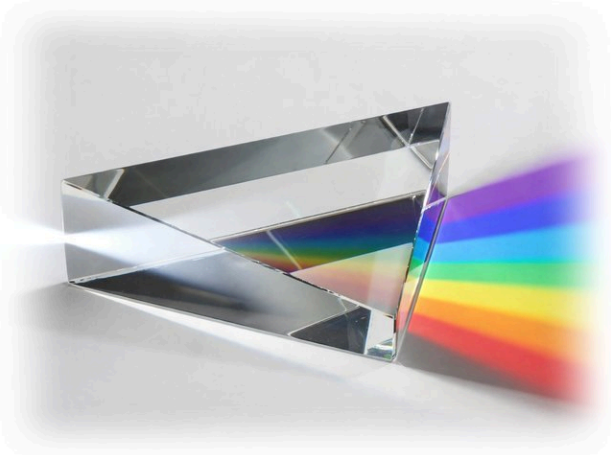
B helium nuclei

C high energy photons

D protons

Understand It with Pulse | Flag a mistake

20 **White light passing through a prism spreads into colors because different colors**



- **A** have the same speed in glass
- **B** refract by different amounts
- **C** are absorbed equally
- **D** travel in straight lines only

Understand It with Pulse | Flag a mistake

21 **An object 4 cm tall is magnified by 3. Its image height, in centimeters, is _____**

ANSWER _____

Understand It with Pulse | Flag a mistake

22 **A sample starts with 64 g of a radioactive isotope. After one half life, the mass remaining, in grams, is ____**

ANSWER _____

Understand It with Pulse | Flag a mistake

23 **A photon has frequency 1.0 × 10^{15} Hz. Using E = hf and h = 6.63 × 10^{-34} J s, its energy in joules is 6.63 × 10^____**

ANSWER _____

Understand It with Pulse | Flag a mistake

24 **Light of wavelength 600 nm in air enters glass of refractive index 1.5. Its wavelength in glass, in nanometers, is ____**

ANSWER _____

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25 **The speed of light in a vacuum divided by the speed of light in a medium gives the medium**



A critical angle

B refractive index

C focal length

D work function

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ANSWER KEY

1.	A	**10.**	A	**19.**	C
2.	C	**11.**	B	**20.**	B
3.	B	**12.**	D	**21.**	12
4.	D	**13.**	A	**22.**	32
5.	D	**14.**	A	**23.**	-19
6.	C	**15.**	B	**24.**	400
7.	B	**16.**	D	**25.**	B
8.	A	**17.**	B		
9.	B	**18.**	C		

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